

REMARKS/ARGUMENTS

Reexamination of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicants basically:

1. Amend independent claims 1, 21, and 33 (see Remarks section "C" infra).
2. Add new claim 36 dependent on independent claim 1.
3. Add new claim 37 dependent on amended independent claim 33 and supported by original independent claim 33.
4. Provide a Summary of the March 17, 2008 Interview.
5. Respectfully traverse all prior art rejections.
6. Refer the Examiner to responses to office actions filed on April 2, 2008 in US Patent application 11/812,564 and US Patent application 11/812,565.

B. SUMMARY OF INTERVIEW/PATENTABILITY ARGUMENTS

Applicants and their representative thank both Examiners Sherman and Awad for the courtesy and cooperation in the scheduling and conducting of the March 17, 2008 interview at the US Patent Office. The following serves to memorialize the interview in accordance with MPEP §713.04 and also to facilitate earnest consideration for allowance of the application.

Applicants' independent claims require a light shielding film (shown as black mask 8 in Fig. 3 and Fig. 4) which extends over a signal line, extends under a pixel

electrode, and in a gap (shown as x' in Fig. 3 and Fig. 4) provided between the signal line and the pixel electrode.

The arrangement of Applicants' independent claims is not taught or suggested by "conventional" Fig. 12 and 13 of Applicants specification: In Fig. 12 and Fig. 13, there is no gap. Indeed, it has been of prime importance in the prior art to obtain an aperture ratio as large as possible, so that providing any sort of a gap would unthinkable and seriously work against industry objectives.

Despite its advantage of large aperture ratio, Applicants noted that the Fig. 12/Fig. 13 conventional structure does suffer from a problem of parasitic capacitance between the signal line and the pixel electrode. Applicants' specification discusses this parasitic capacitance considerably (see, e.g., page 8 *et seq*). The parasitic capacitance is deleterious in the sense that it can cause display unevenness, as explained in Applicants' specification.

Applicants have solved the problem of parasitic capacitance and display unevenness by their claimed structure, which includes the light shielding film extending in a gap provided between the signal line and the pixel electrode.

Independent claim 21 goes yet further to state that a size of the gap is set to provide a desired $\Delta\Delta\beta$ value which is interrelated with display unevenness. [The $\Delta\Delta\beta$ value is described in Applicants' specification, see, e.g., text beginning in the first full paragraph of page 47].

Independent claim 33 specifies the size of the gap, stating specifically that the gap is, e.g., is not less than 1 μm . In addition, independent claim 33 specifies that another parameter, i.e., a width "y", which is an overlap of a second pixel electrode and the light shielding film, is not less than 0.6 μm and not more than 5 μm .

The office action, as presently understood, contends that it would be obvious to provide a gap (such as that alleged to exist in Fig. 2 of JP 07-128685 to Matsuo) in the structure shown in Fig. 12 and 13 of Applicants' specification (mentioned above). All independent claims are rejected and alleged unpatentable in view of this combination.

At the interview Applicants representative presented traversals of the prior art rejection. Specific traversals presented at the interview and reasserted now include the following:

1. To really understand JP 07-128685 to Matsuo, one must consider the historical development of use of a black matrix as recounted by Matsuo. In this regard, Matsuo recounts the use of a black matrix as being on common electrode substrate, but noted that such location of the black matrix on the common electrode substrate reduced the aperture ratio (see ¶ [0002]). Matsuo then mentions that it was then proposed to form the black matrix on the matrix array, such as shown in Fig. 4 and Fig. 5 of Matsuo. In Fig. 5, pixel electrode 3 and source lines 2 are formed on a same plane with the black matrix 8 positioned over and partially blocking the pixel electrode, thereby reducing aperture ratio. Moreover, such black matrix (also called the light-shielding layer 8) was in a floating electrical state (see ¶ [0002] - ¶ [0004]). However, due to the fact that the black matrix 8 was in a floating state, capacitive coupling caused fluctuations in the various potentials (see ¶ [0004]). In view of, e.g., Matsuo's concern regarding aperture ratio, a migration occurs to the Fig. 7 structure wherein the width of the black matrix is reduced, although the structure has cross talk problems. Only after explaining this evolution, with a deliberate emphasis on aperture ratio, does Matsuo arrive at his Fig. 2 structure (upon which the rejection is based).
2. The text of JP 07-128685 to Matsuo never mentions a gap, neither with reference to structure or operation or any putative advantages. Thus, it is

entirely possible (if not likely) that any gap perceived by an observer with respect to Fig. 2 may be an accidental illustration phenomena, and not related to the actual structure or operation of the Matsuo device.

3. But if a gap is to be imputed to JP 07-128685 to Matsuo, the entire teaching of JP 07-128685 to Matsuo relating to the layers surrounding such gap must be taken into account. The gap, if it does exist, cannot be extracted in isolation from Matsuo and grafted into another reference. Important in this regard is the fact that Matsuo's black mask is electrically conductive. In fact, Matsuo's black mask is referred to as a "wiring layer". Matsuo specifically mentions that his black mask as specific potential (see ¶ [0008]); is not floating (see ¶ [0011]); has a specific potential (see ¶ [0015]); can be directly connected using anodization terminals (see ¶ [0012]); and forms a storage capacitance (see page 10).
4. In fact, a purpose of Matsuo's black mask 8, which is electrically conductive, is to form part of a capacitance which serves as an extra storage capacitance for the pixel. Given Matsuo's emphasis upon aperture ratio, Matsuo wants to find further real estate for an auxiliary storage capacitance that is sometimes needed for a display, but without reducing aperture ratio (see ¶ [0008]). Therefore, Matsuo's black mask is made to be electrically conductive so that it can serve as part of an auxiliary capacitance. This requires that Matsuo's interlayer insulating film B have large dielectric capacitance, positioned as it is between the putative capacitor plates of the pixel electrode 3 and black matrix 8. While Applicants defeat parasitic capacitance by providing an insulative light shielding film in a gap, Matsuo takes an opposite tact in forming an auxiliary capacitance with his black mask.
5. Since Matsuo wants to set up an auxiliary capacitance between pixel electrode 3 and black matrix 8, Matsuo does teach overlap of the black matrix 8 and pixel electrode 3. It is also clear that Matsuo teaches overlap

of the black matrix 8 and the signal line by 2 μ m or greater (see ¶ [0012]). But Matsuo never textually describes a gap between the pixel electrode and the signal lines. Rather, it is abundantly clear that Matsuo wants to maximize the aperture ratio (see, e.g., ¶ [0007], stating the Matsuo invention object, and ¶ [0021], last sentence).

C. CLAIM AMENDMENTS AND NEW DEPENDENT CLAIMS

For sake of facilitating allowance of the application, Applicants have amended various claims and added new dependent claims, as explained below.

Independent claim 1 has been amended to further recite that the gap includes an area in which no voltage is applied to a region between the pixel electrode and the signal line. Thus, claim 1 clarifies a layer structure: the gap includes an area between a pixel electrode and a signal line, in which no voltage is applied to a layer between the pixel electrode and the signal line. The amendment is amply supported by the original disclosure, since Applicants' light shielding film is claimed as an insulator and there is no charged layer between the pixel electrode and the signal line in the area of the gap. See also the paragraph bridging pages 15 and 16 of the specification, which states that there is no voltage applied to the liquid crystal layer 32 in the gap, as well as the first full paragraph on page 28 of the specification. From this paragraph one can understand, especially in view of the insulative nature of the Applicants' light shielding film, that neither is voltage is applied in the gap below the pixel electrode and above the signal line. The amendatory language, e.g., the last two lines of amended independent claim 1 is intended to indicate that the gap includes a region to which a voltage to be applied across a counter electrode and a pixel electrode is not applied, and when white is displayed on the whole display panel, the gap has lower luminance (has darker display) than other display regions.

The amendment to independent claim 1 even further distinguishes independent claim 1 over JP 07-128685 to Matsuo, e.g., in addition to the enumerated points of

traversal listed above. Even if Matsuo were alleged to show a gap, certainly any such alleged gap of Matsuo would *not* include an area in which no voltage is applied to a region between the pixel electrode and the signal line. Matsuo's conductive black mask 8, which is electrically connected, e.g., for serving as part of an auxiliary capacitance, negates any contrary interpretation.

Independent claim 21 has been amended to recite that the desired $\Delta\Delta\beta$ value is related to a difference in parasitic capacitance between the pixel electrode and the signal line and affects a difference in an effective value (Vd) of pixel potential of the pixel electrode. The amendatory language is supported by the original disclosure, including (for example) the closing two sentences of the paragraph bridging pages 27 and 28 of the specification; the last paragraph of page 36; the paragraph bridging pages 4 and 45 of the specification; as well as the explanation of $\Delta\Delta\beta$ commencing in the last paragraph of page 47 of the specification. Note particularly the following: that β depends on the parasitic capacitance C_{sd} between the source line and the pixel electrode (see, e.g., the last paragraph of page 47); the definition of the pixel potential effective value Vd (see, e.g., the first full paragraph of page 48); and, that the smaller $\Delta\Delta\beta$ becomes, the smaller the difference in Vd becomes, thereby reducing display unevenness (see, e.g., the discussion commencing on page 48 and particularly the paragraphs bridging page 50 and 51 of the specification).

The undersigned perceived during the interview that further statement or definition in the claim itself regarding the $\Delta\Delta\beta$ value would be welcomed by the examiner for further defining over the prior art. Accordingly, the amendment to independent claim 21 is now presented for advancing prosecution.

Independent claim 33 has been amended to specify that the gap is not less than 1 μm in width and not more than a value at which display unevenness is not sufficiently improved relative to aperture ratio. The amendments to independent claim 33 are supported by the original specification, including (by way of non-limiting example) the

paragraph bridging pages 24 and 25 of the specification, the paragraph bridging pages 43 and 44 of the specification; and the data provided by Fig. 5 and discussion thereof in the specification.

Independent claim 33 has been amended in this manner in response to perceived suggestion by the Examiner that the claim would profit by expressing the phenomena now described without necessarily mentioning a numeric upper endpoint of the range.

New claim 36 is dependent on amended independent claim and specifies that the gap is provided between the signal line and the pixel electrode for reducing parasitic capacitance between the pixel electrode and the signal line. New dependent claim 36 is amply supported by the original disclosure, including (for example) the second full paragraph of page 26 of the specification; the first full paragraph of page 45; and the entire discussion commencing with the first full paragraph of page 46 of the specification. The undersigned was of the impression during the interview that the Examiner would look favorably upon limitations which correlated the gap with reducing parasitic capacitance, and thus new dependent claim 36 is presented.

New claim 37 is dependent on amended independent claim 33 and supported by original independent claim 33. Specifically, new dependent claim 37 recites that the value of the width of the gap is not more than 20 μm . In pursuing dependent claim 37 Applicants affirm that both endpoints of the claimed range (x is in a range of not less than 1 μm and not more than 20 μm) are deemed critical. Criticality of the lower endpoint of not less than 1 μm seemed unquestioned in the interview. Some interview discussion concerned the upper endpoint of 20 μm , apparently in view of specification language about the upper limit being set to be within a range of “preferably 20 μm ”, more preferably 15 μm , (see the paragraph bridging page 24 and 25). However, as illustrated in Fig. 5, 20 μm is a definite value at which the $\Delta\Delta\mathcal{B}$ lower effect, which affects display unevenness, as a result of an increase in the gap size, reaches saturation. Above 20 μm , an increase in the size of gap is no longer followed by a proportional effect, and results

only in decreasing the aperture ratio. Thus, 20 μ m is a critical value beyond which gap size should not be increased at the expense of the aperture ratio. See also pages 46 *et seq.*

Applicants trust that, in the spirit of the interview, the foregoing will enable the Examiner to favorably reconsider patentability of the claims and to withdraw all rejections.

D. MISCELLANEOUS

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /H. Warren Burnam, Jr./

H. Warren Burnam, Jr.,

Reg. No. 29,366

HWB:lsb
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100